

Union of Soviet Socialist Republics
USSR State Committee for Inventions and Discoveries

SPECIFICATION OF AN INVENTION

for an Inventor's Certificate

(19) SU (11) 1354338 A1

(51)4 H 02 K 1/06

(21) 3958974/24-07

(22) 30.09.85

(46) 23.11.87. Bull. No. 43

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(53) 621.313.04(088.8)

(56) USSR Inventor's Certificate No. 1075349, cl. H 02
K 1/06, 1984.

Vinogradov N.V. Production of electrical
machines. Moscow-Leningrad, Gosenergoizdat, 1961,
pp. 93-95.

(54) LAMINATED CORE OF AN ELECTRICAL MACHINE

(57) The invention relates to electrical engineering.

The object of the invention is to increase the steel utilization factor in fabrication. The core is made of plates 1 and fastening elements 2. Plates 1 consist of strips and teeth, the longitudinal axes of which are disposed at an angle to one another. The opposite ends of the strips are rounded. The coordinates of the centers of radius of the roundings are located on a straight line, parallel to the longitudinal axis of the shell. Apertures are formed through the centers of the roundings of the strip ends. Plates 1 of all layers of the core are placed such that the apertures in the strips form channels in which fastening elements 2 are located. In the even-numbered layers of plates 1 of the core, the apertures are disposed to the left of the longitudinal axis of the tooth, and in the odd-numbered

layers - to the right. Adjacent laminae or groups of laminae are turned through 180° and form comb-like surfaces. This makes it possible to simplify the design. 4 figs.

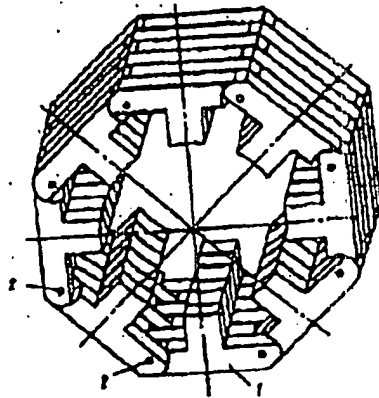


Fig. 1

The invention relates to electrical engineering, in particular to designs of laminated cores of stators and rotors of direct and alternating current electrical machines.

The object of the invention is to simplify the design and to increase the steel utilization factor in fabrication.

Figure 1 shows the design of a core made from individual sections disposed around the periphery; Fig. 2 - the design of the laminae from which the individual sections of the core are assembled; Fig. 3 - the design of an individual section of the core; Fig. 4 - the blank layout of a steel strip when fabricating the laminae.

A core consists of a series of individual sections 1, disposed around the periphery, and fastening elements 2 (Fig. 1). Individual core sections 1 are assembled from laminae (Fig. 2), each of which has tooth 3 and yoke strip 4, one end 5 of yoke strip 4 having a concave, and the other end 6 a convex, surface with radius of curvature r , which is greater than half the width h of strip 4. Centers of curvature 7 and 8

of ends 5 and 6 are located at an identical distance a from axis 9 of tooth 3 on straight line 10, parallel to axis 11 of yoke strip 4. Aperture 12, the center of which coincides with the center of curvature of end 6, is formed in yoke strip 4. In each of individual core sections 1, adjacent laminae or groups of laminae are turned through 180° relative to axis 9 of tooth 3 and form comb-like surfaces 14 and 15 (Fig. 3), by means of which core sections 1 are joined to one another. Fastening elements 2, which hold the core together, are mounted in the cylindrical channels formed by apertures 12 of the laminae. Making ends 5 and 6 of yoke strips 4 rounded, selecting the radius of the rounding as $r > 0.5h$, and corresponding positioning of centers 7 and 8 relative to longitudinal axis 11 of yoke strip 4 of the laminae ensures that cores with any predetermined number of teeth can be fabricated from one and the same laminae. The diameter D of the working surface of the core is then determined using the relationship

$$D = 2\left(\frac{2a}{\sin \pi / z} \mp l\right)$$

where a is the distance from axis 9 of tooth 3 to centres 7 and 8;

l is the distance from straight line 10, which passes through centers 7 and 8, to tooth end 13;

z is 3, 4, 5, - the number of teeth (of individual sections) of the core.

The sign "-" is used when determining the bore diameter of a core with internal teeth (the stators of asynchronous and synchronous machines, the external inductors of direct current machines, etc.); and the sign "+" when determining the outside diameter of a core with an external toothed layer (the rotors of

direct and alternating current machines, internal inductors, etc.).

When fabricating laminae, they are stamped from steel strip 16 (Fig. 4), the width B of which is selected using the condition

$$B = 2h + S,$$

where S is the height of tooth 3.

Simplifying the design of the laminae reduces the labor content of press tool fabrication and creates the preconditions for mechanization and automation of lamination processes which, in combination with the high steel utilization factor, means that the core design now proposed has good prospects for use in mass-produced small electrical machines, and in research and teaching models.

C l a i m

A laminated core of an electrical machine, consisting of individual sections disposed around the periphery and assembled from laminae, each of which has a tooth and a yoke strip, and fastening elements which hold the core together, wherein, with the object of simplifying the design and increasing the steel utilization factor in fabrication, one end of the yoke strip has a concave, and the other a convex, surface with a radius of curvature greater than half the width of the strip and with the centers of the curves located at an identical distance from the axis of the tooth, adjacent laminae or groups of laminae of each section being turned through 180° relative to one another, forming comb-like surfaces by means of which the core sections are joined to one another, and an aperture being formed in the yoke strip for location of the said fastening elements, the center of this coinciding with the center of curvature of the convex surface.

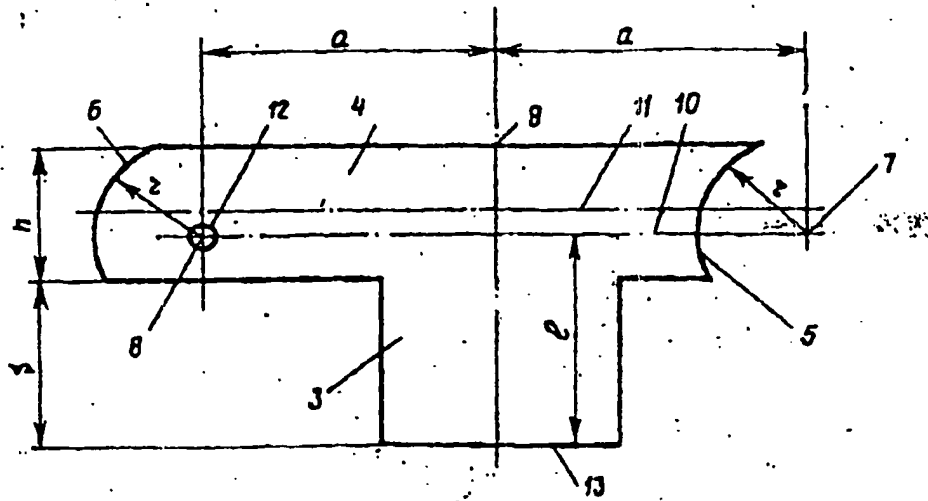


Fig. 2 $\Phi_{12.2}$

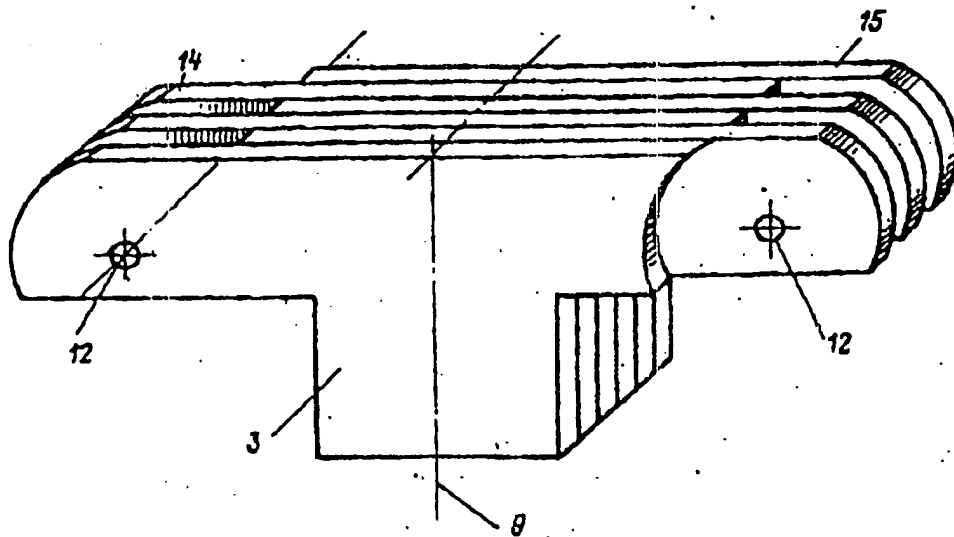


Fig. 3 $\Phi_{12.3}$

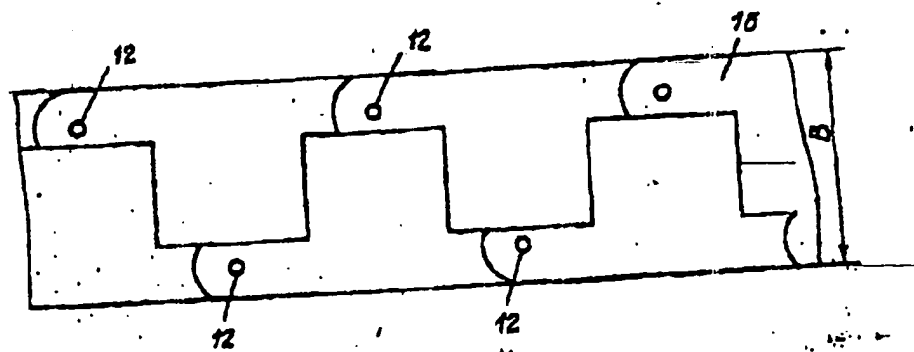


Fig. 4 $\Phi_{12.4}$

Translator's Report/Comments

Your ref: 13P1762

Your order of (date):

In translating the above text we have noted the following apparent errors/unclear passages which we have corrected or amended:

Page/para/line*	Comment
	The formula at the bottom of column 2 is very indistinct - please check against your copy.

* This identification refers to the source text. Please note that the first paragraph is taken to be, where relevant, the end portion of a paragraph starting on the preceding page. Where the paragraph is stated, the line number relates to the particular paragraph. Where no paragraph is stated, the line number refers to the page margin line number.

